Remarks

The Applicants have amended Claims 7, 9 and 15 to recite that the microstructure of the steel article contains soft ferrite at a volume fraction of about 5% to about 70% and the balance substantially composed of bainite, martensite, bainitic ferrite or a mixture containing at least two thereof. Support may be found throughout the Applicants' specification such as on page 7 in paragraph [0018]. Entry into the official file and consideration on the merits is respectfully requested.

The Applicants note with appreciation the withdrawal of all rejections other than the rejection of Claims 7-9 and 15-17 under 35 USC §103 as being obvious over Toyooka.

The Applicants note with appreciation the Examiner's detailed comments hypothetically applying Toyooka against Claims 7-9 and 15-17. The Applicants respectfully submit, however, that Toyooka is inapplicable.

The rejection states that the compositional ranges of the steel of Toyooka overlap the Applicants' claimed compositional ranges, thereby establishing *prima facie* obviousness. The Applicants disagree. The Applicants claim a certain compositional range. However, the Applicants claim other things as well. For example, the Applicants claim a specific microstructure and various other relationships such as the relationships as set forth in equations 1 and 2. This means that a number of affirmatively claimed aspects of Toyooka are not disclosed by the compositional range of Toyooka, thereby rendering Toyooka inapplicable with respect to establishing *prima facie* obviousness.

Moreover, the Applicants' other claimed aspects, while influenced by the compositional ranges, are dependent upon other factors beyond the compositional ranges. For example, the

methods in which the steels are made can and does have a very large impact on the ultimate steel article. In this case, methodology can and does have a material impact on the specifically-claimed microstructure. In other words, similarities in compositional range alone are not enough to establish *prima facie* obviousness.

The rejection also states that the method of manufacture is not claimed in Claims 7-9 and 17 and are drawn to an article of manufacture. The implication there is that the Applicants are not claiming methods in those claims and, accordingly, discussing methods of manufacture is inapplicable. Again, the Applicants disagree. The Applicants do not need to claim the method of manufacture in their article of manufacture claims to have the methods be relevant. That is because, as mentioned above, steel articles such as the seamless expandable oil country tubular articles as recited in Claims 7-9 have characteristics that are influenced not only by their compositional structure, but also the methods in which they are made. Thus, the Applicants respectfully submit that the method of manufacture is indeed applicable to various of the characteristics of those articles.

In that regard, the Applicants respectfully submit that the method of manufacture is applicable to the microstructures within those steels. In this case, the Applicants specifically claim a microstructure that contains soft ferrite at a volume fraction of about 5% to about 70% and the balance substantially composed of bainite, martensite, bainitic ferrite or a mixture containing at least two thereof. This particular claimed structure results not only from the compositional elements, but also the method in which the article is made.

This is relevant because the Applicants have already established that there are differences in the methodology which result in a different article having a different microstructure. This may be seen by comparing the Applicants' claims which call for a soft ferrite and bainite,

martensite, bainitic ferrite or a mixture containing at least two thereof. Toyooka does not disclose this, does not teach this and does not discuss this. Moreover, that structure is not inherent from the compositional range of Tooyoka and the methods in which the Toyooka steels were made.

Toyooka relates to, as set forth in column 1, under the heading "Technical Field of the Invention," namely, "The present invention relates to a steel pipe containing super-fine crystal grains, which has excellent strength, toughness and ductility and superior collision impact resistance and a method for producing the same."

Toyooka states in column 2, under the heading, "Disclosure of the Invention," that the invention relates to "an art of a steel pipe raw material which diameter is reduced by warm drawing and is then applied for use as it is." Therefore, the structure disclosed in Toyooka is a structure after the diameter of the raw material pipe is reduced by warm drawing and according to the invention of Toyooka, the structure is controlled through reduction of diameter in warm drawing. Moreover, Toyooka asserts applicability of not only an electric resistance welded steel pipe, but a seamless pipe, as raw material pipes.

Such being the case, the method of manufacturing a steel pipe according to the Applicants' Claims 7, 9 and 15 and the pipe manufacturing method of Toyooka is completely dissimilar.

To facilitate understanding, the differences of the manufacturing methods and the structures between Toyooka and the Applicant's Claims 7, 9 and 15 will be explained.

In the attached drawing, the vertical axes represents temperature whereas, the horizontal axes, heat pattern of time, and crystal structures of final products. As shown in the attached drawing, Toyooka relates to, as set out in the specification in column 6 at lines 16 to 25, not

only an electric resistance welded steel pipe, but also seamless steel pipe, as in the case of the Applicants' claimed subject matter, which diameter is reduced by warm drawing at a transformation point (Ac_3 or less) and is then applied for use as it is. Therefore, as recited in claim 1 of Toyooka, the microstructure in cross section perpendicular to the pipe length direction in the pipe after the diameter reduction by warm drawing is of ultra fine ferrite having a mean crystal grain diameter of 1 μm or less.

As shown in the attached drawing, the microstructure of Toyooka in the C direction (circumference direction of the steel pipe) is fine and that in the L direction (longitudinal direction of the steel pipe) is extended. For example, Table 11 of Toyooka contains examples of seamless pipes which were subjected to diameter reduction by warm drawing wherein, in contrast to the crystal grain diameter of a raw steel pipe material (6.3 μm, 15.2 μm and 28.1 μm), the crystal grain diameter after the diameter reduction drawing is 1 μm or less. In the case where a steel pipe having the microstructure mentioned above is applied to the Applicants' use and accordingly expanded, cracking can easily be generated in the lengthwise direction of the pipe and therefore is inappropriate for the use wherein pipe expansion is involved.

On the other hand, the seamless steel pipe specified in the Applicants' Claims 7, 9 and 15 relates to seamless expandable oil country tubular goods having a tensile strength of 600 MPa or more, while the yield ratio of 85% or less therein and the crystal grain diameter is considered to be almost the same as that of a raw steel pipe before the diameter reduction by warm drawing disclosed in Toyooka. Nevertheless, the Applicants' Claims 7, 9 and 15 do not require diameter reduction by warm drawing at a transformation temperature (Ac_3) or less. Pertaining to the microstructure of the seamless steel pipe, a seamless steel pipe is rolled at a transformation point or more and the microstructure according to the Applicants' Claims 7, 9 and 15, is recrystallized

during cooling and the size of the crystal grains is large, but has uniform microstructures in the L direction (longitudinal direction of the steel pipe) and in the C direction (circumference direction of the steel pipe). Further, when non-uniform and anisotropic material properties are generated when in an as-rolled state, normalization treatment is further applied to obtain a microstructure therein non-uniform and anisotropic material properties are reduced. By achieving a microstructure as mentioned above, further excellent pipe-expansion property is exhibited.

In other words, in an ordinary seamless steel pipe-forming process (by rolling in a hot temperature range), like a method by the Applicants' Claims 7, 9 and 15, as set out in the Applicants' specification from page 21, at line 15 to page 23, at line 15, "final rolling is preferably finished at a temperature of 800°C or more so that a working strain is not allowed to remain," that is to say, rolling is conducted in a temperature range of higher than Ac_3 transformation point. In other words, according to the Applicants' Claims 7, 9 and 15, reduction of diameter by warm drawing, as is asserted by Toyooka, is not performed. Withdrawal of the rejection is accordingly respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

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